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10/041,681	01/10/2002	Hiroshi Yamamoto	900-411	2957

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EXAMINER
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DIAMOND, ALAN D

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 03/18/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

AS-6

# Office Action Summary

Application No.

10/041,681

Applicant(s)

YAMAMOTO ET AL.

Examiner

Alan Diamond

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 January 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4. 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: reference signs 12a, 13a, 14a, 11c, 12b, 13b, 14b, 27, and 37 in Figures 5 and 6. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 3, 4, and 9-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 3, at line 5, the term "the hole" should be changed "the respective hole" so as to clearly point out the hole that is intended.

In claim 4, at line 2, the term "the surface" should be changed to "a surface" since there is not previously defined other surface. Then, in claim 4, at line 3, the term "on which the holes are provided" should be deleted since it is not needed. Also, in claim 4, at line 4, the term "of the other surface" should be inserted after "irregularity" so as to clearly point out which irregularities are intended.

Claim 9 is indefinite because it is not clear exactly which thin-film solar cell is being manufactured. It is requested that claim 9 be rewritten as "A method of manufacturing the thin-film solar cell claimed in claim 1, characterized in that a surface of the substrate and/or the first transparent conductive layer is etched for forming said plurality of holes on the surface of the first transparent conductive layer at the side of the photoelectric conversion layer.

Claim 10 is indefinite because it is not clear exactly which thin-film solar cell is being manufactured. It is requested that claim 10 be rewritten as "A method of manufacturing the thin-film solar cell claimed in claim 1, characterized in that the first transparent conductive layer is formed so as to have a plurality holes on its surface, whereby said plurality of holes are provided on the surface of the first transparent conductive layer at the side of the photoelectric conversion layer."

In claim 11, at line 10, the term "the photoelectric conversion layer is" should be changed to "the photoelectric conversion layers are each" since there are plural photoelectric conversion layers. The same applies to dependent claims 12-22.

In claim 13, at line 5, the term "the hole" should be changed "the respective hole" so as to clearly point out the hole that is intended.

In claim 15, at line 2, the term "the surface" should be changed to "a surface of the second transparent conductive layer" since there is no previously defined other surface. Then, in claim 15, at line 3, the term "on which the holes are provided" should be deleted since it is not needed. Also, in claim 4, at line 4, the term "of the other

surface" should be inserted after "irregularity" so as to clearly point out which irregularities are intended.

Claim 16 is indefinite because it is not clear exactly which of the transparent conductive layers are being referred to

In claim 17, at line 3, the word "first" should be changed to "one".

Claim 18 is indefinite because it is not clear exactly which of the photoelectric conversion layers are being referred to.

Claim 19 is indefinite because it is not clear exactly which of the crystalline i-layers are being referred to.

Claim 21 is indefinite because it is not clear exactly which thin-film solar cell is being manufactured. Furthermore, the multiple uses of the term "an/or" at lines 2 and 3 render the claim confusing. It is requested that claim 21 be rewritten as "A method of manufacturing the thin-film solar cell claimed in claim 11, characterized in that a surface of at least one of the substrate, the first transparent conductive layer, and the second transparent conductive layer is etched for forming said plurality of holes on the surface of the first transparent conductive layer and on the surface of the second transparent conductive layer."

Claim 22 is indefinite because it is not clear exactly which thin-film solar cell is being manufactured. It is requested that claim 22 be rewritten as "A method of manufacturing the thin-film solar cell claimed in claim 11, characterized in that the first transparent conductive layer and/or the second transparent conductive layer is formed so as to have a plurality of holes on its surface, whereby said plurality of holes are

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provided on the surface of the first transparent conductive layer and on the surface of the second transparent conductive layer.”

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 5, 6, 8-11, 16, 18, and 20-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Wada et al, U.S. Patent Application Publication 2002/0050289 A1. Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

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Wada et al teaches a thin film solar cell comprising a substrate (11a); a transparent conductive layer (11c or 11d) and a pin photoelectric conversion layer comprising n-type layer (12), i-type crystalline silicon layer (13); and p-type layer (14), wherein as seen in Figures 1 and 2, the transparent conductive layer (11c or 11d) clearly has a plurality of holes on its surface of the side of the photoelectric conversion layer, and said holes have irregularities at their surface (see also paragraphs [0044] through [0055]). Figure 3 shows a multijunction thin-film solar cell having glass substrate (11a); first transparent conductive layer (11d), first photoelectric conversion layer (32) having p-type, i-type and n-type amorphous layers; a second transparent conductive layer (33), and a second photoelectric conversion layer 34 having an i-type crystalline silicon layer (see also paragraphs [0212] through [0223]). Note that said first transparent conductive layer (11d) and said second transparent conductive layer (33) have the claimed holes and irregularities (see Figure 3). Since Wada et al teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

6. Claims 1, 2, 5, 6, and 8-10 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 11-274530 A, herein referred to as JP '530.

JP '530 teaches a solar cell comprising a substrate (101), a transparent conductive layer (103) such as ZnO, and a photovoltaic layer made of a pin junction where the i-layer of the pin junction is microcrystalline silicon (see the attached English abstract; Figure 1; and Example 1). As clearly seen in Figure 2, said transparent conductive layer (103) has plural holes and irregularities formed on the surface of the holes, as here claimed. Note that the substrate (101) can have an irregular surface as

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per instant claim 2 (see paragraph [0036]). Since JP '530 teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

***Claim Rejections - 35 USC § 102/103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 3, 4, 13, 14, 15, and 17 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Wada et al, U.S. Patent Application Publication 2002/0050289 A1. Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Wada et al teaches a thin film solar cell comprising a substrate (11a); a transparent conductive layer (11c or 11d) and a pin photoelectric conversion layer comprising n-type layer (12), i-type crystalline silicon layer (13); and p-type layer (14), wherein as seen in Figures 1 and 2, the transparent conductive layer (11c or 11d) clearly has a plurality of holes on its surface of the side of the photoelectric conversion layer, and said holes have irregularities have their surface (see also paragraphs [0044] through [0055]). Figure 3 shows a multijunction thin-film solar cell having glass substrate (11a); first transparent conductive layer (11d), first photoelectric conversion layer (32) having p-type, i-type and n-type amorphous layers; a second transparent conductive layer (33), and a second photoelectric conversion layer 34 having an i-type



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crystalline silicon layer (see also paragraphs [0212] through [0223]). Note that said first transparent conductive layer (11d) and said second transparent conductive layer (33) have the claimed holes and irregularities (see Figure 3). It is the Examiner's position that the limitations in instant claims 3 and 4 concerning hole diameter and depth, and irregularity difference in height, are inherently present in, for example, the solar cells prepared in Wada et al's Examples 1-6. Furthermore, it is the Examiner's position that the limitations in instant claims 13, 14, 15, and 17 concerning hole diameter and depth, and irregularity difference in height, are inherently present in, for example, the solar cells prepared in Wada et al's Examples 7-9. Since Wada et al teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

In addition, the instantly claimed limitations concerning hole diameter and depth, and irregularity difference in height, would obviously have been present once Wada et al's thin-film solar cells in Examples 1-9 are provided. Note In re Best, 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 USC 103 in addition to the rejection made above under 35 USC 102.

9. Claims 3, 4, and 7 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over JP 11-274530 A, herein referred to as JP '530.

JP '530 teaches a solar cell comprising a substrate (101), a transparent conductive layer (103) such as ZnO, and a photovoltaic layer made of a pin junction where the i-layer of the pin junction is microcrystalline silicon (see the attached English abstract; Figure 1; and Example 1). As clearly seen in Figure 2, said transparent

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conductive layer (103) has plural holes and irregularities formed on the surface of the holes, as here claimed. It is the Examiner's position that the limitations in instant claims 3, 4, and 7 concerning hole diameter and depth, irregularity difference in height, and  $I_{220}/I_{111}$  ratio are inherently present in, for example, the solar cell prepared in JP '530's Examples 1-7. Since JP '530 teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

In addition, the instantly claimed limitations concerning hole diameter and depth, irregularity difference in height, and  $I_{220}/I_{111}$  ratio would obviously have been present once JP '530 solar cells in Examples 1-7 are provided. Note In re Best, 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 USC 103 in addition to the rejection made above under 35 USC 102.

### ***Double Patenting***

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 1, 3-6, 8-11, 13-18, and 20-22 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable

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over claims 1-31 of copending Application No. 09/984,905. Although the conflicting claims are not identical, they are not patentably distinct from each other because it is the Examiner's position that the irregularities on the surface of the zinc oxide transparent conductive layer in the claimed solar cell of said copending application are essentially the same as the instantly claimed irregularities.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent 6,211,454 is of the same family as JP 11-274530. U.S. Patents 4,694,116, 5,589,008, 5,977,477, 6,072,117, 6,459,043, and 6,465,727, and EP 893833 are hereby made of record.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan Diamond whose telephone number is 703-308-0840. The examiner can normally be reached on Monday through Friday, 6:15 a.m. to 2:45 p.m. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 703-308-3322. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Alan Diamond  
Primary Examiner  
Art Unit 1753



Alan Diamond  
March 4, 2003